

## **DESIGNING OF AN EDUCATIONAL BOOK FOR DRAWING THE BASIC FLAT PATTERN**

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### **ABSTRACT**

The apparel industry is one of the industries that need to be developed in order to keep abreast of the continuing global developments, in the fashion lines and the types of fabrics used to provide a garment product that satisfies the taste of the consumer. There are a number of specialized programs, for drawing flat models that facilitate the drawing of pattern, including the program AutoCAD, which is known as a computer design program for 2D and 3D designs, issued by the American company Autodesk, and is used in any areas of engineering design, architecture, mechanical engineering and interior design. The research aims to identify the problems faced by students in the flat base pattern, prepare of a simple textbook for the steps of flat base patron and implement of models ready for the basic flat surface of Saudi women. The sample of the research consisted of students of level I and II of Fashion Design Department, where the number of (40) students. The results of the research confirmed that, the effectiveness of the educational book to explain the steps of the basic flat patron, there are statistically significant differences between the average grades of students in the tribal and remote application of the educational book to draw the basic flat platform for the benefit of the post-application.

**KEYWORDS:** An Educational Book, AutoCAD Program, Basic Flat Pattern, Pattern Programs

### **INTRODUCTION**

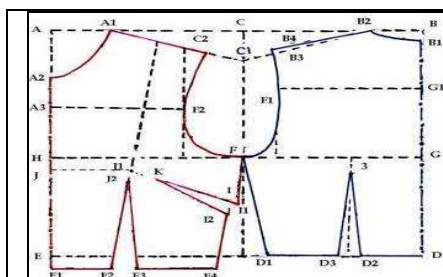
The ready-made clothing industry is considered one of the industries, that needs continued development, in order to keep abreast of the continued global developments, in the fashion lines and the types of fabrics used in order to provide the clothing product that satisfies the consumer's taste and to achieve the highest level of productivity with the lowest rate of consumption of the raw materials and the auxiliary materials, and that to reach the required quality for the final product and maintained it with the lowest economic cost, to satisfy the consumer's needs (Hemdan, 2007 AD).

The clothing industry considers one of the works that have an importance in the society. The importance of clothing appeared from an ancient age, where it meets the human needs in covering his nakedness and protecting the body from the weather fluctuations, so the importance of the clothing has appeared because, there is a correlation between the law of God and the garment, in order to cover the body's nakedness and adorning it, 1985 AD. Human has become keen on having large amount of the culture awareness, to acquire a set of clothing that are suitable for his body shape and the style of his environment in accordance with the era that he lives in it (Shataownadr, 1999 AD). The clothing industry needs a number of requirements such as the pattern, that is lines and curves are drawn on paper in artistic and geometrical methods, these lines and curves are based on the precise measurements of a particular body and take the shape of this body by the seams and darts (Figure 1), and the pattern considers the base that any design can be built on it (Farghaly, 2009 AD).

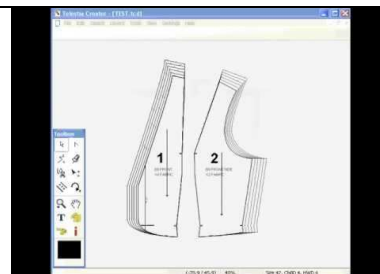
The pattern is an approach that has its basics and concepts. And the quality of the pattern is largely based on the understanding of the person who makes the pattern for any model and how to translate the model lines and implementing them on the pattern if it is with two dimensions "geometrical" or three dimensions (Farghaly, 2009 AD).

There are many of the specialized programs, to draw the flat models that facilitate the drawing of the pattern, including the AutoCAD program, that is known as a computer design program to design the 2D and 3D designs (Figure 2), this program had been issued by the American company Autodesk, and used in any areas of the geometrical design, architecture, mechanical engineering and the interior design. (www.arabworld.com).

Because of the different methods used to draw the basic flat pattern and the difficulties that the students face in finding an unified method to facilitate the drawing of the basic pattern with their measurements, a simplified educational book had been designed, to explain the steps of drawing the basic flat pattern in easy steps and approved by specialists, and that was the reason to discuss the subject of the research " Design of an educational book for drawing the basic flat pattern".



**Figure 1: Basic Flat Pattern**



**Figure 2: Basic Flat Pattern by Drawing Programs**

### Research Problem

The problem of the research can be concluded in the following questions:

- What are the difficulties and problems that the students face in drawing the basic pattern?
- Can put steps for drawing the basic pattern in a simplified method?
- Can use the computer software in drawing the basic pattern?
- Can prepare ready-made models for the basic pattern with the Saudi women's measurements?

### Research Goals

- Identifying the problems that the students face in drawing the basic flat pattern.
- Preparing a simplified educational book for the steps of drawing the basic flat pattern.
- Implementing ready-made models for the basic flat pattern with the Saudi women's measurements.

### Research Importance

- Designing an educational book to serve the fashion design students in drawing the basic flat pattern.
- Finding simplified steps to draw the basic flat pattern.

- Making ready-made models for the basic flat pattern with measurements suitable for the Saudi bodies.

### **Research Hypotheses**

- The effectiveness of the educational book to explain the steps of drawing the basic flat pattern.
- There are statistically significant differences among the mean of the students' degrees in the pre-application and the post-application of the educational book to draw the basic flat pattern in favor of the post-application.

## **RESEARCH METHODOLOGY**

The research approach follows the applied experimental method, that is related to the field of application in general, and is interested with the application and development of the basic knowledge research, and it is a model from research that fulfills the application and development of the knowledge that is based on the searching of factors, and introducing new variable and observing its effect, and that means the experiments by which dependent variables and independent variables can be determined, for the ability to judge the success or failure of the experiment (Zaiton, 2004 AD). The researcher used it to design the pattern with what is suitable to the type of the section and what it do of changes that help to understand and develop the reality, and its availability in the local markets and commercial trading.

Experimental research requires flexibility and clarity, and the information should be comprehensive for all events related to the situation, starting with identifying the phenomenon, and then collecting data on it by using the various scientific research tools such as; interviewing and questionnaire in accordance with the nature of the data for the purpose of testing them and reaching the generalizations and general results that can be applied (Dawood, 2006). The researcher used (the experimental research) to collect the necessary data in the pattern by distributing the questionnaires on the students and analyzing the data to reach the results and generalizations that can be applied on other cases in the society.

### **Research Sample**

The sample of the research consisted of the students of the first and second level in the Fashion Design College - Clothing and Textile Department, where their number was (40) students from one Department.

### **Research Tools**

The researcher interviewed the students of the first and second level in the College of Design, Clothing and Textile Department, and distributed the questionnaire papers (difficulties that they face in drawing the pattern) on them and was as follows:

- Determining the objectives of the interview, the information required for the research.
- Determining the category or individuals to be interviewed.
- Determining the questions of the interview and formulating them in a scientific manner, so as it is necessary to have the clarity and objectivity, and order, and its suitability to the level of the addressing category.
- Determining the appropriate place and time.

### **Questionnaire**

The questionnaire consists of a set of diverse questions that are related to each other in a way that determines the objective. Therefore, the researcher subjected the information that she obtained from the interview to a classification and arrangement, and then she prepared the questionnaire items with the problem of the research and its objectives and hypotheses and formulated them in clear and specific terms and in logical order, where the researcher used the restricted picture with the specific answers (the opened closed questionnaire), and the answer is measured by the triple estimation balance (yes, no, sometimes) with the addition of a suggested question to any opinion or suggestion related to the research subject, so that the tested student is given the freedom to answer (Abidat et al., 2004 AD).

The questionnaire aims to identify the difficulties and problems that the students face in the fashion design department in "drawing the basic pattern". The questionnaire had included three main axes:

The first axis: Demographic data that represented in "the student's name, level".

The second axis: The laws used in drawing the pattern.

The third axis: The difficulties that the students are faced in drawing the basic pattern.

Where the applied study aims to identify the requirements and needs of the students in the design department, and translate the ideas into designs that serve the department, and trying to manufacture them locally, and commercialize them in the local markets that contribute to satisfying the desires of consumers in this category, in addition to the profit and the progress of the country.

### **Theoretical Framework**

- Drawing and preparation of the basic flat pattern by using the computer.
- The importance of the good knowledge to draw the basic flat pattern.

### **Methods of Obtaining the Basic Flat Pattern**

Designing of patterns by the flat pattern method that based on the use of a simple basic pattern that can be changed or modified with a clear basis for creating a new pattern that fits the chosen design is one of the three methods used in design: Drafting - Draping - Commercial pattern.

#### **Drafting**

In this method the designer uses accurate tables for body measurements, and there are two ways to draw with measurements (Figure 3):

**A-** The basic pattern with standard measurements.

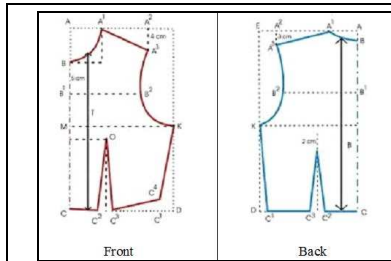
**B-** The basic pattern with personal measurements.

#### **Draping**

This method requires from the designer forming the fabric on the person or on the body model to obtain the required basic pattern. After making sure that the pattern is adjusted, it transfers on the paper and adjusting its lines with transfer of all data and marks (Figure 4).

### Commercial Basic Pattern

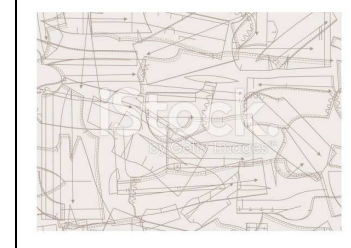
Figure 5 shows the commercial basic pattern. Companies produce basic patterns that are drawn according to the international standard measurements (Bukhari, 2007 AD).



**Figure 3: Basic Flat Pattern by Drafting**



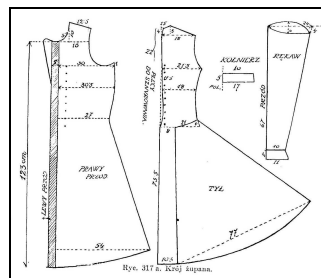
**Figure 4: Method of Draping**



**Figure 5: Commercial Basic Pattern**

### Comparison between Different Methods of the Pattern Constructing

It is a method that restricts the designer because it depends on the certain measurements table, and therefore it becomes impractical to create the ever-changing designs of women's clothing. This method has retained some of its importance in men's clothing because men's fashion has been relatively constant in the past. And the method of drawing with measurements despite their limitations, it used in companies that sell designs according to sizes (Figure 6).



**Figure 6: Pattern Drawn by the Drafting Method**

### Draping Method

It is a method used by the talented designer as the French fashion designers. Many of designer's uses this method because they are working more happily with fabric or because the design has complex hung down effects, and can be achieved better if used the Draping method. However, this method has some disadvantages, such as:

- The need for a model of the body as a basis for work in this method.
- The cost of time and fabric.

### Flat Pattern Method

Designing with the flat pattern is the method that the designer uses in it a basic pattern that is previously prepared to fit the size of a specific person or a standard size as a basis for the work of other designs. And the success in this method depends on the used basic pattern and the ability of the pattern maker on taking accurate measurements of the body, so the followed bases in studying the flat pattern are general bases can be used in any basic pattern already prepared by draping on the body model or on the body itself.

The flat pattern clearly shows the connections between the parts of the pattern to the student, and makes him estimate the necessity of the accuracy in order to have a good line. It teaches him how to maintain the same level of his flat pattern accuracy, regardless of the various designs. It also allows him to implement the well-adjusted clothes that can be produced industrially, and that give the standardized results in the design and accuracy. Also, it allows the innovation that based on valid fixed rules (Bukhari, 2007 AD)

### **Stages of Obtaining the Final Pattern of Design**

**A - Putting the design lines on the pattern:** It has named (construction pattern), or (work pattern). (PANE, OP, CIT, P).

**B - Method of implementation or work pattern:** It has named (procedure), (work procedure), or (work pattern).

**C - The final pattern:** All of the specialists agreed on this name, and the following names will be used for the stages to illustrate the work itself, and they express the stages in designing the pattern:

A- Design pattern

B- Work pattern

C- The final pattern (Bukhari, 2007 AD)

## **THE RIGHT METHOD FOR TAKING THE BODY'S MEASUREMENTS**

### **Brief About the Measurements**

Measurements are one of the most important criteria for testing the ready-made garments. We find the individual is interested in the model, color or the fabric when choosing a piece of clothes.

But he may stand confused for the measurement number that is appropriate for his body size and length. However, it is important to the individual to know the size of his body and how to take these measurements, and what size is the number of the ready-made garment that is appropriate for him.

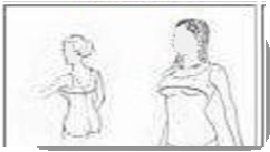






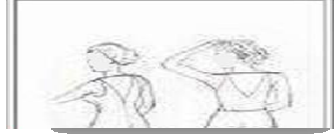

### **Points That Must Take Into Consideration When Taking the Measurements**

- It is preferable that the individual does not take the measurements for himself, but another person can perform this task.
- It is preferable to take the measurements on underwear.
- Determining the placement of waist with thin belt or tape with a width of about 2 cm.
- Not tightening the measurement tape on the body.
- Not use an old measuring tape that can be stretched, and that in order to obtain accurate measurements (Farghaly, 2009 AD).

### **The Methods of Taking the Measurements**

In Table 1 listed the body measurements and the right method to take the accurate measurements.

**Table 1: Methods of Taking the Accurate Body Measurements**

		
The measurement: Chest circumference	The measurement: Waist circumference	The measurement: Back length
		
The measurement: Chest length	The measurement: Hip circumference	The measurement: Side length
		
The measurement: Back width	The measurement: Shoulder length	The measurement: Total length

### Programs Used in Drawing the Basic Flat Pattern

There are many types of practical programs that can be used in education, and in this search the AutoCAD program had used and subjected to draw the patterns.

#### AutoCAD

It is a program for making the geometrical panels for the various applications, whether architectural, civil, or other geometrical applications (1).

The programs are the second component of the computer components, and the programs have specific functions in the computer, where they are responsible for direct the orders to the computer. The programs are designed by specialists known as (programmers). And due to the importance of using computer technology and its systems in the garment industry, specialized software producers in this field may seek to increase their efficiency and seek further development and expand their use. The applied programs are the most important types of programs that can be used in the garment industry, and they are divided into:

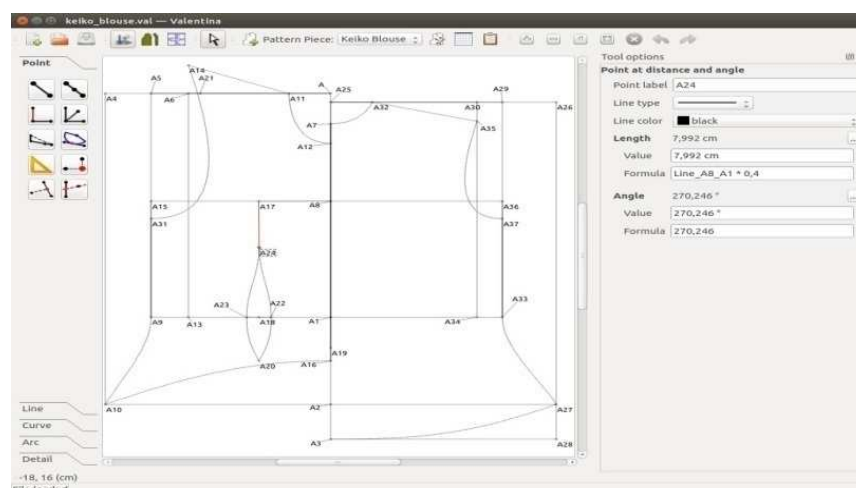
- Ready-made programs: They are prepared by agreement of specialized companies that are designed and sell them for general use. And they are multi-purpose and can be used in multiple areas.
- Special programs: programs designed specifically for a particular institution or company, to serve the circumstances of that institution (2)

The computer program divisions

- Operating System Programs: They are the programs that help the computer to manage it such as: (Windows Ms - DOS UNIX).
- Assistance programs: The task of this program is to improve the operating systems, and they are the mediator between the operating system.

## Gerber System

In 1945, Joseph Gerber performed several technological researches in the field of clothing, which was the cornerstone for what is named Gerber Scientific Company. And in the United States of America, Gerber founded in 1978 a company called by his name, and it specialized in the development of the programmed cutting machines by using computer, and he created their own system, and test record. And AMI System Hugh was soon sold to Gerber Company that was one of the largest producers of Plotter, which consists of CAD - CAM in doing the processes of grading and making the marker. There are two computer systems in the CAD design: marketing these systems in the USA and Europe, and they have great success for the great garment producers (Figure 7).



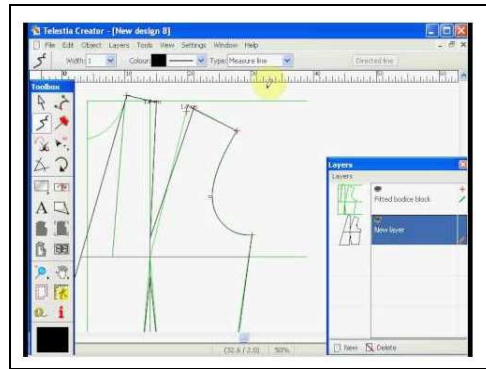
**Figure 7: Computer Drawing Programs**

In late 1970, in Dallas, Texas, the most important revolution was in the world of clothing production, since the first sewing machine appeared as an invention before more than 100 years ago, where the entry of computer technology into the clothing industry. And Ron Maritel is the main designer of CAD systems and is one of the first who attempted to use evolution.

## Assyst System

Many clothing manufacturers discussed this problem with the Assyst team and were able to provide a step in this area to develop the Pattern Design System (PDS). The Assyst system relied on Hardware to transfer data to computers without problems because it is more powerful to accommodate software needs, they used Computers Hewlett Packard Mini, and chose the Unix operating system that supports more than one user, with meeting the different needs at the same time, and the pattern drawing system achieved great success, and the first system of pattern designing was introduced by the PDS. The Assyst PDS system had linked to the Geber Camsco Organization system, and the experience of linking the two systems together succeeded, and the data were transferred to the system without any problems and then the Assyst PDS system was sold to the Geber Camsco organization, company, and in (1985) Assyst company began marketing the first integrated system for pattern designing and this was the beginning of the system. In 1987, the Cuttex-Pro system was introduced in Germany to design the pattern, grading and implementing of the marker computer-assisted, and support the system with the idea of graphic input, and in 1988 the Pad system was introduced in Canada and the main name was the Pattern Add Design, and this system considered an idea to see the pattern in the three dimensions (Figure 8).





**Figure 8: Program Assyst**

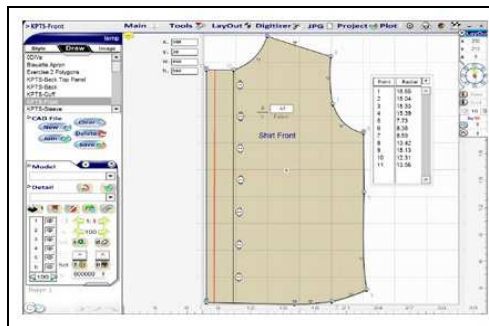
### Lectra System

In the same period in 1978, a French company began to introduce its own marketing system, which did not differ much in its content from the previous system, but it was from the beginning with a special character in the specifications of the equipment in addition to the use of its own operating system ILOS.

### AutoCAD Program

The AutoCAD desktop like Windows programs, contains a set of drop-down menus at the top of the program, desktop, they are: the File menu for handling with files, the Edit menu for the cut and paste operation, the View menu for the zoom and other options (Mohammed, 2007 AD).

The AutoCAD program (Figure 9) can be adapted to suit different uses. It is a program designed to perform the process of geometric drawing in its form: The drawing is at the level (x, y, z), and this means the 3D drawing.



**Figure 9: AutoCAD Program**

### The Applied Study

This study aims to prepare a simplified educational book to draw the basic flat pattern for the fashion design students and preparing ready models for the basic flat pattern, and identifying the difficulties and problems that the students face when drawing the basic pattern and solve these problems.

### Tools Used in the Study

- Computer
- Drawing the models in the program (AutoCAD) in the computer

- A camera to photograph the samples for the arbitration

### The Experimental Samples

In order to ascertain the stage of drawing the guideline for the height of the basic chest dart, two samples were implemented in two different methods.

**Method 1:** Using the fourth result in the division.

**Method 2:** Using the unreal guideline, and through the sample found that the second method is the best and appropriate for the bodies in general, and the following image shows the sample by using the fourth result "unreal line".



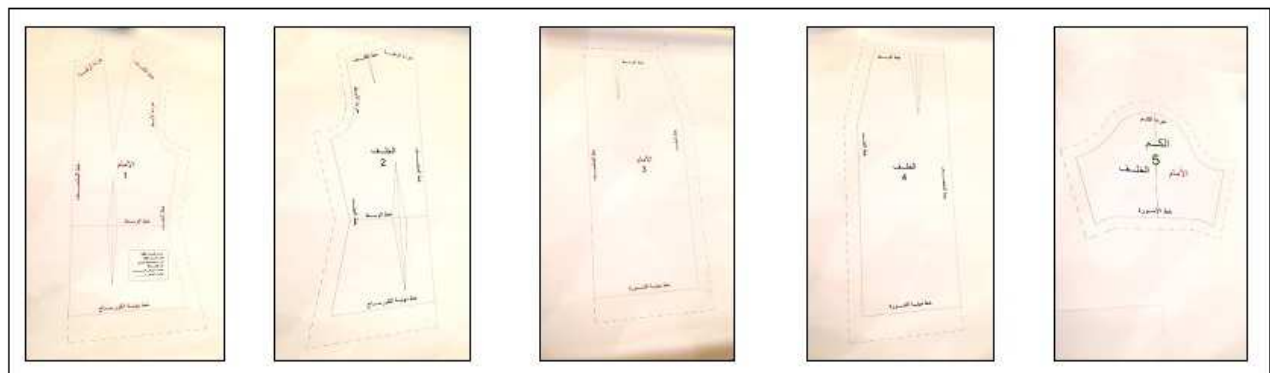
**Figure 10: Sample by Using the Fourth Result "Unreal Line"**

### Arbitration Form

The items of the arbitration firm were prepared according to the steps and stages of drawing and preparing of the basic flat pattern, which was arbitrated by specialists in the field of patterns and the implementation of clothing.

### The Flat Pattern with the Saudi Women's Measurements

Patterns in various measurements were prepared according to the size of the Saudi woman's body. The size (40) was selected to represent the mean of sizes (basic size) and had printed and enveloped to be available and easy to use by students and housewives who are not specialized in this field. The following figure (Figure 11) shows the preparation of the pattern.



**Figure 11: Printed Models of the Basic Pattern**

### Sincerity of the Questionnaire

Sincerity refers to the ability of the questionnaire to represent what had put to measure, and that through presenting it in its initial form to the specialized professors, to identify their views in the questionnaire and its achievement

to the goal that it was put for it, and the validity of the formulation of the phrases scientifically, and that has resulted some modifications in the phrases and their formulation and arrangement.

### The Sincerity of the Internal Consistence

The sincerity had been calculated by using the internal consistence and that by calculating the correlation coefficient (Pearson's correlation coefficient) between the degree of each phrase and the degree of the questionnaire (Table 2).

**Table 2: Values of the Correlation Coefficients between the Degree of Each Phrase and the Degree of the Questionnaire**

Phrase Scale	Correlation	Sig.	Phrase Scale	Correlation	Sig.
1	0.612	0.05	10	0.778	0.01
2	0.846	0.01	11	0.901	0.01
3	0.726	0.01	12	0.640	0.05
4	0.915	0.01	13	0.938	0.01
5	0.801	0.01	14	0.876	0.01
6	0.635	0.05	15	0.705	0.01
7	0.891	0.01	16	0.927	0.01
8	0.608	0.05	17	0.829	0.01
9	0.749	0.01			

The table shows that the correlation coefficients are all significant at the level of (0.01- 0.05) because it is close to 1, and that indicates the sincerity and the homogeneity of the scale phrases.

### Reliability

Reliability means the test accuracy in the measurement and observation, not a contradiction with itself, and its consistence in providing us with information about the tester's behavior, and it is the ratio between the degree variations on the scale which refers to the actual performance of the testate. The reliability had been calculated by:

- Alpha Cronbach coefficient
- Split-half method

**Table 3: Values of the Reliability Coefficient for the Questionnaire**

	Alpha Coefficient	Split-Half
Reliability of questionnaire as a whole	0.829	0.784 - 0.881

The above table shows that all the values of reliability coefficients: alpha coefficient, split-half, significant at the level of 0.01 and that indicates the reliability of the questionnaire.

### Survey Results

Are there problems and difficulties in drawing the basic flat pattern for the fashion design students?

In answering this question, the questionnaire was applied to 40 students to conclude the problem.

**Table 4: Survey Results of the Questionnaire**

Question	Answer					
	Yes		No		Sometimes	
	Number	Percentage	Number	Percentage	Number	Percentage
1- Can you take the correct measurements?	8	20 %	29	72.5 %	3	7.5 %
2- Is the law of the chest dart height is clear for you?	10	25 %	20	50 %	10	25 %
3- Is the law of shaping the waist and buttocks clear for you?	10	25 %	25	62.5%	5	12.5%
4- Do you prefer the paper ruler in odd numbers or even numbers in drawing your pattern?	40 (ruler in odd number)	100% (ruler in odd number)	0 (ruler in even number)	0% (ruler in even number)	0	0%
5- Do you find difficulty in drawing the basic pattern bigger with your personal measurements?	20	50%	11	27.5%	9	22.5%
6- Can you draw the basic pattern for any size?	16	40 %	9	22.5 %	15	37.5 %
7- Did you implement the basic pattern on the fabric?	30	75%	10	25%	0	0%

The answer of the question number 8 (What are the difficulties that you face in drawing the pattern?) is presented in table 5.

**Table 5: The Difficulties That the Student Face in Drawing the Basic Pattern**

What are the Difficulties that you Face in Drawing the Pattern?	Number	Percentage
Divisions	1	2.5 %
Drawing the basic pattern bigger	1	2.5 %
Drawing curves	4	10 %
Making the model on the pattern	2	5 %
Decimal fractions	2	5 %
General difficulties	30	75 %
Sum	40	100%

Through the above, it is clear that there are general and varied difficulties, some of the students determined some difficulties in drawing the basic flat pattern, and that due to several reasons, such as the difficulty of drawing the pattern due to the different methods of drawing the flat pattern, and the different specialists who teaching the principles of the patterns. And to confirm that, Nader (2002 AD) proved that there are difficulties facing the students in the Clothing and Textile Department in the clothing industry, subject, and also Hemdan (2007 AD) through the study of the factors influencing the garment industry and its obstacles in the Saudi Arabia Kingdom.

## RESULTS AND DISCUSSIONS

There are 18 hypothesis (questions) investigated and concluded in this research. The results of pre- and post-application of the educational book on 40 students were presented (table 6) and then discussed separately.

**Table 6: The Significance of the Differences among the Mean of the Students' Degrees in the Pre-application and the Post-application of the Educational Book**

Effectiveness	Mean "M"	Standard Deviation "S"	Number of Sample Individuals "N"	Degrees of Freedom "df"	"t" Value	Level of Significance And Its Direction
	Hypothesis 1: What is the Effectiveness of the Educational Book to Explain the Steps of Drawing the Basic Flat Pattern?					
Pre-application	49.545	4.153	40	39	48.310	0.01 In favor of the post-application
Post-application	459.613	11.324				
	Hypothesis 2: The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to find the width and length of the pattern					
Pre-application	2.165	0.774	40	39	18.552	0.01 In favor of the post-application
Post-application	30.25	3.067				
	Hypothesis 3: The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to determine and draw the back neckline					
Pre-application	4.054	0.849	40	39	22.657	0.01 In favor of the post-application
Post-application	35.187	4.221				
	Hypothesis 4: The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to determine and draw the longitudinal guideline					
Pre-application	2.203	0.614	40	39	15.448	0.01 In favor of the post-application
Post-application	27.928	3.111				
	Hypothesis 5: The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to draw the crosswise guideline					
Pre-application	4.509	0.952	40	39	11.359	0.01 In favor of the post-application
Post-application	24.136	4.377				
	Hypothesis 6: The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to draw the placed line of the front chest dart					
Pre-application	2.088	0.406	40	39	17.449	0.01 In favor of the post-application
Post-application	30.692	3.278				
	Hypothesis 7: The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to determine shoulders lines					
Pre-application	5.051	0.588	40	39	12.268	0.01 In favor of the post-application
Post-application	26.517	3.573				
	Hypothesis 8: The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to draw the guideline to determine the chest dart					
Pre-application	3.200	0.236	40	39	10.698	0.01 In favor of the post-application
Post-application	24.319	5.087				
	Hypothesis 9: The significance of the differences among the mean of the students' degrees in the pre-application and the post-application for the steps of drawing the main dart of the chest					
Pre-application	4.958	0.231	40	39	19.203	0.01 In favor of the post-application
Post-application	33.327	4.189				
	Hypothesis 10: The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to separate the front from the back "drawing the separating line between the front and back"					
Pre-application	3.267	0.514	40	39	16.037	0.01 In favor of the post-application
Post-application	29.029	3.569				

	Hypothesis 11: The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to draw the front and back armhole					
Pre-application	2.274	0.505	40	39	23.942	0.01 In favor of the post-application
Post-application	34.023	3.881				
	Hypothesis 12: The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to determine the waist shaping					
Pre-application	1.889	0.718	40	39	9.753	0.01 n favor of the post-application
Post-application	22.950	3.520				
	Hypothesis 13: The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to determine the side length					
Pre-application	1.589	0.433	40	39	8.463	0.01 In favor of the post-application
Post-application	19.324	2.357				
	Hypothesis 14: The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to draw the waist dart					
Pre-application	2.556	0.403	40	39	13.381	0.01 In favor of the post-application
Post-application	23.515	2.946				
	Hypothesis 15: The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to adjust the waist shaping					
Pre-application	2.228	4.0.683	40	39	16.533	0.01 In favor of the post-application
Post-application	28.099	3.177				
	Hypothesis 16: The significance of the differences among the mean of the students' degrees in the pre-application and the post-application for the steps of drawing the shoulder dart					
Pre-application	4.088	0.339	40	39	14.426	0.01 In favor of the post-application
Post-application	25.251	2.887				
	Hypothesis 17: The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to determine and draw the buttocks shaping					
Pre-application	1.637	0.286	40	39	9.593	0.01 In favor of the post-application
Post-application	20.555	2.914				
	Hypothesis 18: The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to adjust the side length					
Pre-application	1.789	0.318	40	39	12.663	0.01 In favor of the post-application
Post-application	24.504	2.098				

## DISCUSSIONS

### Hypothesis 1

What is the effectiveness of the educational book to explain the steps of drawing the basic flat pattern?

To verify this hypothesis, the "t" test had been applied, and the following table shows that.

Table 6 shows that the value of "t" equals "48.310", and it is a statistically significant value at the level (0.01), where the mean of the students' degrees in the after- application was "459.613", while the mean of the students' degrees in the pre-application was "49.545", which indicates the existence of real differences between the two applications in favor of the post-application, and this indicates the effectiveness of the educational book to explain the steps of drawing the basic flat pattern.

To determine the effect size, the Eta equation had been applied:  $t = 48.310$ ,  $df = 39$

$$n^2 = \frac{t^2}{t^2 + df} = 0.98$$

By calculating the effect size, was found that:  $n^2 = 0.98$

$$d = \frac{2 \sqrt{n^2}}{\sqrt{1-n^2}} = 13.97$$

The size of the effect is determined whether it is big, medium or small, as follows:

0.2 = small effect size

0.5 = medium effect size

0.8 = big effect size

This means that the effect size is bigger, thus the first hypothesis are achieved.

## Hypothesis 2

There are statistically significant differences among the mean of the students' degrees in the pre-application and the post-application of the educational book to draw the basic flat pattern in favor of the after application.

To verify this hypothesis, the "t" test had been applied, and the following tables show that.

In table 6, the significance of the differences among the mean of the students' degrees in the pre-application and the post-application to find the width and length of the pattern was presented.

Table (6) shows that the value of "t" equals "18.552" to find the width and length of the pattern, and it is a statistically significant value at the level (0.01) in favor of the post-application, where the mean of the students' degrees in the after- application was "30.257", while the mean of the students' degrees in the pre-application was "2.165".

## Hypothesis 3

The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to determine and draw the back neckline was presented.

Table (6) shows that the value of "t" equals "22.657" to determine and draw the back neckline, and it is a statistically significant value at the level (0.01) in favor of the post-application, where the mean of the students' degrees in the after- application was "35.187", while the mean of the students' degrees in the pre-application was "4.054".

## Hypothesis 4

The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to determine and draw the longitudinal guidelines was presented.

Table (6) shows that the value of "t" equals "15.448" to determine and draw the longitudinal guidelines, and it is a statistically significant value at the level (0.01) in favor of the post-application, where the mean of the students' degrees in the after- application was "27.928", while the mean of the students' degrees in the pre-application was "2.203".

### Hypothesis 5

The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to draw the crosswise guideline was presented.

Table (6) shows that the value of "t" equals "11.359" to draw the crosswise guideline, and it is a statistically significant value at the level (0.01) in favor of the post-application, where the mean of the students' degrees in the after-application was "24.136", while the mean of the students' degrees in the pre-application was "4.509".

### Hypothesis 6

The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to draw the placed line of the front chest dart was presented.

Table (6) shows that the value of "t" equals "17.449" to draw the placed line of the front chest dart, and it is a statistically significant value at the level (0.01) in favor of the post-application, where the mean of the students' degrees in the after-application was "30.692", while the mean of the students' degrees in the pre-application was "2.088".

### Hypothesis 7

The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to determine shoulders lines was presented.

Table (6) shows that the value of "t" equals "12.268" to determine shoulders, lines, and it is a statistically significant value at the level (0.01) in favor of the post-application, where the mean of the students' degrees in the after-application was "26.517", while the mean of the students' degrees in the pre-application was "5.051".

### Hypothesis 8

The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to draw the guideline to determine the chest dart was presented.

Table (6) shows that the value of "t" equals "10.698" to draw the guideline to determine the chest dart, and it is a statistically significant value at the level (0.01) in favor of the post-application, where the mean of the students' degrees in the after-application was "24.319", while the mean of the students' degrees in the pre-application was "3.200".

### Hypothesis 9

The significance of the differences among the mean of the students' degrees in the pre-application and the post-application for the steps of drawing the main dart of the chest was presented.

Table (6) shows that the value of "t" equals "19.203" for the steps of drawing the main dart of the chest, and it is a statistically significant value at the level (0.01) in favor of the post-application, where the mean of the students' degrees in the after-application was "33.327", while the mean of the students' degrees in the pre-application was "4.958".

### Hypothesis 10

The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to separate the front from the back "drawing the separating line between the front and back" was presented.



Table (6) shows that the value of "t" equals "16.037" to separate the front from the back "drawing the separating line between the front and back", and it is a statistically significant value at the level (0.01) in favor of the post-application, where the mean of the students' degrees in the after- application was "29.029", while the mean of the students' degrees in the pre-application was "3.267."

#### **Hypothesis 11**

The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to draw the front and back armhole was presented.

Table (6) shows that the value of "t" equals "23.942" to draw the front and back armhole, and it is a statistically significant value at the level (0.01) in favor of the post-application, where the mean of the students' degrees in the after- application was "34.023", while the mean of the students' degrees in the pre-application was "2.274".

#### **Hypothesis 12**

The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to determine the waist shaping was presented.

Table (6) shows that the value of "t" equals "9.753" to determine the waist shaping, and it is a statistically significant value at the level (0.01) in favor of the post-application, where the mean of the students' degrees in the after- application was "22.950", while the mean of the students' degrees in the pre-application was "1.889".

#### **Hypothesis 13**

The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to determine the side length was presented.

Table (6) shows that the value of "t" equals "8.463" to determine the side length, and it is a statistically significant value at the level (0.01) in favor of the post-application, where the mean of the students' degrees in the after- application was "19.324", while the mean of the students' degrees in the pre-application was "1.589".

#### **Hypothesis 14**

The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to draw the waist dart was presented.

Table (6) shows that the value of "t" equals "13.381" to draw the waist dart, and it is a statistically significant value at the level (0.01) in favor of the post-application, where the mean of the students' degrees in the after- application was "23.515", while the mean of the students' degrees in the pre-application was "2.556".

#### **Hypothesis 15**

The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to adjust the waist shaping was presented.

Table (6) shows that the value of "t" equals "16.533" to adjust the waist shaping, and it is a statistically significant value at the level (0.01) in favor of the post-application, where the mean of the students' degrees in the after- application was "28.099", while the mean of the students' degrees in the pre-application was "2.228".

### Hypothesis 16

The significance of the differences among the mean of the students' degrees in the pre-application and the post-application of the steps of drawing the shoulder dart was presented.

Table (6) shows that the value of "t" equals "14.426" for the steps of drawing the shoulder dart, and it is a statistically significant value at the level (0.01) in favor of the post-application, where the mean of the students' degrees in the after- application was "25.251", while the mean of the students' degrees in the pre-application was "4.088".

### Hypothesis 17

The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to determine and draw the buttocks shaping was presented.

Table (6) shows that the value of "t" equals "9.593" to determine and draw the buttocks shaping, and it is a statistically significant value at the level (0.01) in favor of the post-application, where the mean of the students' degrees in the after- application was "20.555", while the mean of the students' degrees in the pre-application was "1.637".

### Hypothesis 18

The significance of the differences among the mean of the students' degrees in the pre-application and the post-application to adjust the side length was presented.

Table (6) shows that the value of "t" equals "12.663" to adjust the side length, and it is a statistically significant value at the level (0.01) in favor of the post-application, where the mean of the students' degrees in the after- application was "24.504", while the mean of the students' degrees in the pre-application was "1.789", thus the second hypothesis is achieved.

There are several ways to draw the flat pattern is not unified with existence of differences among them and they contain a lot of the detailed explanation, which makes it difficult for some to understand them, thus it found that it is better to take advantage of all the methods used in drawing the basic flat pattern and put an unified methodology in a clear and simple steps through making an educational guidebook for the students in the Fashion Design Department and housewives with the Saudi women's measurements, where be arbitrated by specialists in the field of the patterns and the clothing implementation, and that confirmed by Abden (1995 AD) and Alsaman (1997 AD) in her book "Encyclopedia of Clothing" and Farghali (2001 AD) in her book (Ready-made clothing between the preparation and production) and Arbe'en and Salam(2008 AD).

Through the field visits, it observed that the local markets, lack of presence of the ready-made models with the Saudi women's bodies as a reference for the specialists and other of the housewives, and characterized by simplicity, clarity and ease of use, as demonstrated by Arbe'en and Salam (2008Ad) through finding standard sizes for the body of the Saudi woman. Also, Haji (2003 AD) confirmed that the problems facing the consumer are the different measurements of the pieces of clothing with the body of the Saudi woman, and that because of the factories use the foreign measurements and there aren't measurements tables approved by the Authority of the Standards and Specifications of Saudi bodies, and after the making of the book and completed it was introduced on the members of the faculty who specialized in the field of patterns to view it, make adjustments and presenting it in its final image.

## CONCLUSIONS

The ready-made garment industry is one of the industries that needs to be developed in order to keep abreast of the continuing global developments in the fashion lines and the types of fabrics used to provide a garment product that satisfies the taste of the consumer and to achieve the highest level of productivity with the lowest rate of consumption of raw materials and auxiliary materials. Required for the final product and maintained with the lowest economic costs to satisfy the needs of the consumer.

There are a number of specialized programs to draw flat models that facilitate the drawing of Albatron, including the program AutoCAD, which is known as a computer design program for 2D and 3D designs, issued by the American company Autodesk, and is used in any areas of engineering design, architecture, mechanical engineering and interior design.

A sample of the research: The sample of the research consisted of students of level I and II in the College of Fashion Design Department of clothing and textile, where the number of (40) students from one section.

### the Research Aimed to:

- Identifying the problems faced by students in the flat base pattern.
- Preparation of a simple textbook for the steps of flat base pattern.
- Implementation of models ready for the basic flat surface of Saudi women.

### The Research Reached to

- The effectiveness of the educational book to explain the steps of the basic flat patron.
- There are statistically significant differences between the average grades of students in the tribal and remote application of the educational book to draw the basic flat platform for the benefit of the post-application.

### Research Recommendations

- Interesting in the book and what it contains of information in the study of the basic flat pattern.
- Adoption of this book in the library of the College of Design for students of the Clothing and Textiles Department.
- The need for the adoption of teaching members to teach the content of the book when drawing the basic flat pattern.
- Identifying this book to the students of the College of Clothing and Textiles and all those interested in fashion design.
- The unified method of drawing the basic flat pattern contributes in improving the educational level of the students.

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